E **B4E551** **Pages: 2**

Reg. No._____ Name:_____

APJ ABDUL KALAM TECHNOLOGICAL UNIVERSITY

FOURTH SESTER B.TECH DEGREE EXAMINATION, JUNE 2017

Course Code**: CH208**

Course Name**: CHEMISTRY FOR PROCESS ENGINEERING II (CH)**

Max. Marks: 100 Duration: 3Hours

PART A

Answer any Two questions each carries 15 marks.

1. a) Discuss the principle of Potentiometric titrations. How would you determine the equivalence points of a solution of HCl against a standard solution of NaOH? (6)

   b) What is dropping mercury electrode? What are its advantages and limitations? (4)

   c) Write short note on (i) Residual current (ii) Migration current. (5)

2. a) Explain the Ilkovic equation for describing the limiting diffusion current in polarography. (5)

   b) Write short note on KLL transition. Describe the three steps involved in Auger Electron Spectroscopy. (5)

   c) Explain the principle and instrumentation of X-ray Photo Electron Electroscopy.(5)

3. a) How does Scanning Tunneling Electron Microscope work and give its instrumentation? (5)

   b) Explain the working of Atomic Force Microscopy. What are its advantages and disadvantages? (5)

   c) Write explanatory notes on (i) Molecular ion peak (ii) Rearrangement ion peak (iii) Base peak (iv) Isotope peak (5)

PART B

Answer any Two questions each carries 15 marks.

4. a) Discuss the practical applications of Distribution law. (4)

   b) Explain the variation of mutual miscibility of phenol- water with variation of temperature. (5)

c) Discuss the vapour pressure properties of two immiscible liquids. How are these facts utilized in steam distillation? (6)

5. a) Explain Arrhenius theory of weak electrolytes. (5)

b) State and explain Kohlrausch's law. (4)

c) Explain asymmetry effect and electrophoretic effect. (6)

6. a) State the Distribution law. How is the law modified when the solute enters in to chemical combination with one of the solvents? (6)

b) Explain the critical solution temperature taking triethylamine- water as example.(5)

c) Write short notes on electrochemical sensors. (4)

PART C

Answer any Two questions each carries 20 marks.

7. a) Derive Langmuir's adsorption isotherm. (6)

b) Explain the term Zeta potential. Discuss its role in flocculation of colloidal systems. (4)

c) What are colloids? Discuss their classification. (5)

d) What are surfactants? Give its important uses. (5)

8. a) Explain Donnan membrane equilibrium. (5)

b) What are emulsions? Explain its important properties. (5)

c) Compare and contrast the properties of α, β and γ rays. (5)

d) What is nuclear cross section? Give its relation with reaction rate. (5)

9. a) Derive an equation for decay constant of first order decay of a radioactive material. (5)

b) Describe the principle behind the radioactive dating. (5)

c) Discuss the application of radioactive isotope in the medical field. (5)

d) Calculate the binding energy per nucleon of oxygen atom $^{16}_{8}O$ which has a mass of 15.994910 amu. Mass of neutron is 1.008665 amu. Mass of proton is 1.007277 amu. Mass of electron is 0.0005484 amu. (5)

****